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FOR
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The IEEE Standard Dictionary of Electrical and Electronics Terms

Sixth Edition

Standards Coordinating Committee 10, Terms and Definitions
Jane Radatz, Chair

This standard is one of a number of information technology dictionaries being developed by standards organizations accredited by the American National Standards Institute. This dictionary was developed under the sponsorship of voluntary standards organizations, using a consensus-based process.

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How to use this dictionary

The terms defined in this dictionary are listed in *letter-by-letter* alphabetical order. Spaces are ignored in this style of alphabetization, so *cable value* will come before *cab signal*. Descriptive categories associated with the term in earlier editions of IEEE Std 100 will follow the term in parentheses. New categories appear after the definitions (see Categories, below), followed by the designation of the standard or standards that include the definition. If a standard designation is followed by the letter s, it means that edition of the standard was superseded by a newer revision and the term was not included in the revision. If a designation is followed by the letter w, it means that edition of the standard was withdrawn and not replaced by a revision. A bracketed number refers to the non-IEEE standard sources given in the back of the book.

Acronyms and abbreviations are no longer listed in a separate section in the dictionary; rather, they are incorporated alphabetically with other terms. Each acronym or abbreviation refers to its expanded term, where it is defined. Acronyms and abbreviations for which no definition was included in past editions have been deleted from this edition of IEEE Std 100.

Abstracts of the current set of approved IEEE standards are provided in the back of the book. It should be noted that updated information about IEEE standards can be obtained at any time from the IEEE Standards World Wide Web site at <http://standards.ieee.org/>.

Categories

The category abbreviations that are used in this edition of IEEE Std 100 are defined below. This information is provided to help elucidate the context of the definition. Older terms for which no category could be found have had the category "Std100" assigned to them. Note that terms from sources other than IEEE standards, such as the National Electrical Code® (NEC®) or the National Fire Protection Association, may not be from the most recent editions; the reader is cautioned to check the latest editions of all sources for the most up-to-date terminology.

electron sheath (gas) A film of electrons (or of ions) that has formed on or near a surface that is held at a potential different from that of the discharge. *Synonym:* ion sheath. *See also:* discharge. (ED) [45], [84]

electron-stream potential (any point in an electron stream) (electron tube) The time average of the potential differential difference between that point and the electron-emitting surface. *See also:* electron emission. (ED) 161-1971w

electron-stream transmission efficiency (electron tube) (electrode through which the electron stream passes) The ratio of the average stream current through the electrode to the average stream current approaching the electrode. *Note:* In connection with multitransit tubes, the term electron stream should be taken to include only electrons approaching the electrode for the first time. *See also:* electron emission. (ED) 161-1971w

electron telescope An optical instrument for astronomy including an electronic image transformer associated with an optical telescope. *See also:* electron optics. (ED) [45], [84]

electron tube An electron device in which conduction by electrons takes place through a vacuum or gaseous medium within a gastight envelope. *Note:* The envelope may be either pumped during operation or sealed off. (ED) 161-1971w

electron-tube admittances The cross-referenced terms generalize the familiar electron-tube coefficients so that they apply to all types of electron devices operated at any frequency as linear transducers. *Note:* The generalizations include the familiar low-frequency tube concepts. In the case of a triode, for example, at relatively low frequencies the short-circuit input admittance reduces to substantially the grid admittance, the short-circuit output admittance reduces to substantially the plate admittance, the short-circuit forward admittance reduces to substantially the grid-plate transconductance, and the short-circuit feedback admittance reduces to substantially the admittance of the grid-plate capacitance. When reference is made to alternating-voltage or -current components, the components are understood to be small enough so that linear relations hold between the various alternating voltages and currents. Consider a generalized network or transducer having n available terminals to each of which is flowing a complex alternating component I_j of the current and between each of which and a reference point (which may or may not be one of the n network terminals) is applied a complex alternating voltage V_j . This network represents an n -terminal electron device in which each one of the terminals is connected to an electrode. (EEC/PE) [119]

electron-tube amplifier An amplifier that obtains its amplifying properties by means of electron tubes. (IA) [60]

electron-wave tube An electron tube in which mutually interacting streams of electrons having different velocities cause a signal modulation to change progressively along their length. (ED) 161-1971w

electronvolt The kinetic energy acquired by an electron in passing through a potential difference of 1V in vacuum; $1 \text{ eV} = 1.602 \times 10^{-19} \text{ J}$ approximately. (QUL) 268-1982s

electro-optic effect (fiber optics) A change in the refractive index of a material under the influence of an electric field. *Notes:* 1. Pockels and Kerr effects are electro-optic effects that are respectively linear and quadratic in the electric field strength. 2. "Electro-optic" is often erroneously used as a synonym for "optoelectronic." *See also:* optoelectronic. (Std100) 812-1984w

electro-optic field meter A meter that measures changes in the transmission of light through a fiber or crystal due to the influence of the electric field. *Note:* While there are several electro-optic methods that can be used for measuring electric fields, e.g., the Pockels effect, the Kerr effect, and interferometric techniques, this recommended practice only considers electro-optic field meters that utilize the Pockels effect. (PE/T&D) 1308-1994

electroosmosis The movement of fluids through diaphragms that is as a result of the application of an electric current. (EEC/PE) [119]

electroosmotic potential (electrobiology) The electrokinetic potential gradient producing unit velocity of liquid flow through a porous structure. *See also:* electrobiology. (EMB) [47]

electrophonic effect The sensation of hearing produced when an alternating current of suitable frequency and magnitude from an external source is passed through an animal. (SP) [32]

electrophoresis A movement of colloidal ions as a result of the application of an electric potential. *See also:* ion. (EEC/PE) [119]

electrophoretic potential (electrobiology) The electrokinetic potential gradient required to produce unit velocity of a colloidal or suspended material through a liquid electrolyte. *See also:* electrobiology. (EMB) [47]

electroplating The electrodeposition of an adherent coating upon an object for such purposes as surface protection or decoration. (EEC/PE) [119]

electropneumatic brake An air brake that is provided with electrically controlled valves for control of the application and release of the brakes. *Note:* The electric control is usually in addition to a complete air brake equipment to provide a more prompt and synchronized operation of the brakes on two or more vehicles. *See also:* electric braking. (EEC/PE) [119]

electropneumatic contactor (1) A contactor actuated by air pressure. *See also:* contactor. (IA) [60]

(2) (electropneumatic unit switch) A contactor or switch controlled electrically and actuated by air pressure. *See also:* contactor; control switch. (VT) 16-1955w

electropneumatic controller An electrically supervised controller having some or all of its basic functions performed by air pressure. *See also:* electric controller; multiple-unit control. (IA) [60]

electropneumatic interlocking machine An interlocking machine designed for electric control of electropneumatically operated functions. *See also:* centralized traffic-control system. (EEC/PE) [119]

electropneumatic valve An electrically operated valve that controls the passage of air. (EEC/PE) [119]

electropolishing (electroplating) The smoothing or brightening of a metal surface by making it anodic in an appropriate solution. *See also:* electroplating. (EEC/PE) [119]

electrorefining The process of electrodissolving a metal from an impure anode and depositing it in a more pure state. (EEC/PE) [119]

electroretinogram *See:* electrodermogram.

electroscope An electrostatic device for indicating a potential difference or an electric charge. *See also:* instrument. (EEC/PE) [119]

electrosensitive printer A nonimpact printer in which images are generated on specially coated paper by an electric stylus. (C) 610.10-1994

electroshock therapy The production of a reaction in the central nervous system by means of electric current applied to the cranium. *See also:* electrotherapy. (EMB) [47]

electrostatic actuator An apparatus constituting an auxiliary external electrode that permits the application of known electrostatic forces to the diaphragm of a microphone for the purpose of obtaining a primary calibration. *See also:* microphone. (SP) [32]

electrostatic coupling *See:* signal.

electrostatic deflection (cathode-ray tubes) Deflecting an electron beam by the action of an electric field. *See also:* cathode-ray tube. (ED) [45]

electrostatic discharge (ESD) (1) Electrical discharges of static electricity that build up on personnel or equipment, generated by interaction of dissimilar materials. (PE) 1143-1994

the material of the conductor. A consequence of this effect is that if a current exists in a conductor between two points at different temperatures, heat will be absorbed or liberated depending on the material and on the sense of the current.

2. In a nonhomogeneous conductor, the Peltier effect and the Thomson effect cannot be separated. *See also:* thermoelectric device. (ED) [46]

Thomson heat The thermal energy absorbed or evolved as a result of the Thomson effect. *See also:* thermoelectric device. (ED) [46]

thrashing A state in which a computer system is expending most or all of its resources on overhead operations, such as swapping data between main and auxiliary storage, rather than on intended computing functions. (C) 610.12-1990

thread (1) (control) A control function that provides for maintained operation of a drive at a preset reduced speed such as for setup purposes. *See also:* electric drive. (IA) [60]

(2) **(data management)** In a tree, a set of link fields, one in each node, each of which points to the successor or predecessor of that node with respect to a particular traversal order. (C) 610.5-1990

(3) A single flow of control within a process. Each thread has its own thread ID, scheduling priority and policy, *errno* value, thread-specific key/value bindings, and the required system resources to support a flow of control. Anything whose address may be determined by a thread, including but not limited to static variables, storage obtained via *malloc()*, directly addressable storage obtained through implementation-supplied functions, and automatic variables shall be accessible to all threads in the same process. (C/PA) 9945-1-1996

(4) A single sequential flow of control within a process. (C/PA) 1224.2-1993, 1326.2-1993, 1327.2-1993, 1328.2-1993, 14252-1996

threaded coupling (rigid steel conduit) An internally threaded steel cylinder for connecting two sections of rigid steel conduit. (EEC) [28]

threaded tree A tree whose nodes contain link fields for one or more threads, allowing nonrecursive traversal of the tree. *See also:* doubly-threaded tree; left-threaded tree; right-threaded tree; triply-threaded tree. (C) 610.5-1990

thread ID A unique value of type *pthread_t* that identifies each thread during its lifetime in a process. (C/PA) 9945-1-1996

threading line (conductor stringing equipment) A lightweight flexible line, normally manila or synthetic fiber rope, used to lead a conductor through the bullwheels of a tensioner or pulling line through a bull wheel puller. *Synonyms:* bull line; threading rope. (PE/T&D) 524-1992

threading rope *See:* threading line.

thread list An ordered set of runnable threads that all have the same ordinal value for their priority. The ordering of threads on the list is determined by a scheduling policy or policies. The set of thread lists includes all runnable threads in the system. (C/PA) 9945-1-1996

thread of control A sequence of instructions executed by a conceptual sequential subprogram, independent of any programming language. More than one thread of control may execute concurrently, interleaved on a single processor, or on separate processors. The conceptual threads of control in an Ada application are Ada tasks. They may, but need not, correspond to the POSIX threads defined in POSIX.1c. (C/PA) 1003.5b-1995

thread-safe A function that may be safely invoked concurrently by multiple threads. Each function defined by this standard is thread-safe unless explicitly stated otherwise. An example is any "pure" function (a function that holds a mutex locked while it is accessing static storage or objects shared among threads). (C/PA) 9945-1-1996

thread-specific data key A process global handle of type *pthread_key_t* that is used for naming thread-specific data. Although the same key value may be used by different threads, the values bound to the key by *pthread_setspecific()*

and accessed by *pthread_getspecific()* are maintained on a per-thread basis and persist for the life of the calling thread. (C/PA) 9945-1-1996

threat (1) A potential violation of security. (C/LM) 802.10-1992

(2) Means by which a system may be adversely affected. Threats include both inadvertent and malicious actions. (BA/C) 896.3-1993

three-address Pertaining to an instruction code in which each instruction has three address parts. Also called triple-address. In a typical three-address instruction the addresses specify the location of two operands and the destination of the result, and the instructions are taken from storage in a preassigned order. *See also:* two-plus-one address. (C) 162-1963w

three-address instruction (1) A computer instruction that contains three address fields. For example, an instruction to add the contents of locations A and B, and place the results in location C. *Contrast:* four-address instruction; one-address instruction; two-address instruction; zero-address instruction. (C) 610.12-1990

(2) An instruction containing three addresses. *Synonym:* triple-address instruction. *See also:* address format. (C) 610.10-1994

three-bit byte *See:* triplet.

three-conductor bundle *See:* bundle.

three-dimensional graphics The presentation of data on a two-dimensional display surface so that it appears to represent a three-dimensional model, and can be viewed from any position. *Note:* Each coordinate of the model contains a triplet of information; for example, x, y, and z in the Cartesian coordinate system. (C) 610.6-1991

three-dimensional hardware A graphical display processor that accepts three-dimensional information as input and generates an image directly rather than using a projection transformation. (C) 610.6-1991

three-dimensional priority The property possessed by a line or surface that is in front of another line or surface from the viewer's perspective. (C) 610.6-1991

three-dimensional radar (navigation aid terms) A radar capable of producing three-dimensional position data on a multiplicity of targets. (AE) 172-1983w, 686-1990w

3GL *See:* high-order language.

three-input adder *See:* full adder.

three-level address *See:* n-level address.

3-of-9 bar code A variable length, bidirectional, discrete, self-checking, alpha-numeric bar code. Its basic data character set contains 43 characters: 0 to 9, A to Z, -, ., /, +, \$, %, and space. Each character is composed of 9 elements: 5 bars and 4 spaces. Three of the nine elements are wide (binary value 1) and six are narrow (binary value 0). A common character (*) is used exclusively for both a start and stop character. (PE) C57.12.35-1996

three-phase ac fields (electric and magnetic fields from ac power lines) Three-phase transmission lines generate a three-phase field whose space components are not in phase. The field at any point can be described by the field ellipse, that is, by the magnitude and direction of the semi-major axis and the magnitude and direction of its semi-minor axis. In a three-phase field, the electric field at large distances ≥ 15 meters (m) away from the outer phases (conductors) can frequently be considered a single-phase field because the minor axis of the electric field ellipse is only a fraction (less than 10%) of the major axis when measured at a height of 1 m. Similar remarks apply for the magnetic field. *See also:* electric field strength. (PE/T&D) 644-1979s

three-phase circuit (electric installations on shipboard) (power and distribution transformers) A combination of circuits energized by alternating electromotive forces which differ in phase by one-third of a cycle (120 degrees). In practice, the phases may vary several degrees from the specified angle. (IA/PE) 45-1983r, C57.12.80-1978r